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AUTHOR	Klitgaard, Robert E.
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ABSTRACT

In this report, the author discusses the problem of educational change in terms of four basic elements: the objectives, the implementation process, the production possibilities, and the evaluation process. To illuminate both the logic of explanation and the specific needs for research, two competing explanatory models are developed: (1) the naive hypothesis, which focuses on local objectives and the low productivity of various educational innovations, and which has restrictive implications for federal R&D policy; and (2) the organizational model, which notes that educational objectives are inherently vague and production possibilities imperfectly known and seldom implemented, and which concentrates instead on the relative freedom of educational bureaucracies to make policy and on the self-serving incentive structures. Since research has not yet touched on many basic issues of the problem, there is sparse evidence to disprove either model. More importantly, there are few directives on how more detailed, policy relevant explanations should be developed. Further research is necessary into the process of innovation itself. This paper formulates an agenda for such research. (Author)

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MODELS OF EDUCATIONAL INNOVATION AND IMPLICATIONS FOR RESEARCH

Robert E. Klitgaard

The Rand Corporation, Santa Monica, California

SUMMARY

Innovation in public schools (or lack thereof) is a subject of much emotion and speculation, but disappointingly little analysis and systematic research. Thus, while anecdotes and partial explanations abound, especially those vilifying educators and the organizational characteristics of schools, empirical work has still not touched many basic issues.

Many factors might explain why schools pursue the pattern of innovation they do. A full explanation must include discussion of objectives, the implementation process, the production possibilities, and the evaluation process. Research on one aspect alone cannot provide an explanation, any more than simple correlation can explain a system with many independent variables. Yet where should research begin in tackling four such broad topics?

To illuminate both the logic of explanation and the specific needs for research, two competing explanatory models are developed. The naive hypothesis focuses on local objectives and the low productivity of various educational innovations, and has restrictive implications for federal R&D policy. The organizational model notes that educational objectives are inherently vague and production possibilities imperfectly known and seldom implemented. It concentrates instead on the relative freedom of educational bureaucracies to make policy and on their self-serving incentive structures. In some formulations, the organizational explanation could constitute a call to arms for a policy of massive, federally-supported innovations.

Although the author favors the naive hypothesis, there is clearly not enough evidence to decide which is more correct for which circumstances, nor, more importantly, how more detailed, policy-relevant explanations should be developed. The most important part of the paper, therefore, is the final section, which builds on the previous discussion to formulate an agenda for research. It is not just a question of more. A systematic approach must be used, and important conceptual problems remain unsolved.

MODELS OF EDUCATIONAL INNOVATION AND IMPLICATIONS FOR RESEARCH*

I. INTRODUCTION

Discussions of change in education take place in a unique environment of emotion and uncertainty. Nowhere does change conjure up images of such an intimate and universal intervention by the state into the lives of its citizens. Nowhere does change threaten such an important bastion of the principle of local control. Nowhere is there such unclearness about objectives and how to measure results, yet nowhere either such a widespread presumption by the average citizen that he knows what makes schooling succeed and fail. Nowhere have there been such high hopes about the potential of public policy to remedy social inequalities -- yet nowhere such a present feeling of discontent.

The need for change is widely recognized. According to many observers, the public is generally disappointed with the present state of affairs. Despite enormous increases in government expenditures, despite the widely-lauded goals of compensatory programs, despite exorbitant promises about new technologies, many people feel that education is just about where it was ten years ago.

Academic research has reinforced these dour sentiments. Beginning with the Coleman report and continuing through the most recent analyses, large-scale surveys and experimental studies have failed to locate school policies that consistently and importantly affect student outcomes. Grades and achievement scores, the hallmarks of school success, have turned out to correlate poorly with later occupational and professional attainment. Most of the ballyhooed innovations have suffered such short half-lives that one begins to suspect deeper causes to their exponential

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*The stimulus for this paper was John Pincus' "Incentives for Innovation in the Public Schools" (Rand P-4946, January 1973). It was only after writing the paper that I realized my indebtedness to Graham Allison's formulation of Model I and Model II, which correspond rather well to the naive and organizational hypotheses respectively. This is known as internalization. See Allison's Essence of Decision: Explaining the Cuban Missile Crisis (Boston 1971). I benefitted from discussions with George Hall, William Klitgaard, John Pincus, and Daniel Weiler.

decay. Yet despite the discontent, educational change has not occurred, at least not in many people's minds.

In this emotional climate of widely-felt but imperfectly perceived failure, it is not unnatural that scapegoat-hunting should flourish. Deeply-held beliefs about the importance of education have been challenged by the failures; it is no surprise that instead of abandoning faith in the ultimate efficacy of schooling, critics should lay blame on faulty implementation. The favorite culprit has been the educational establishment itself. Accused of self-serving motives, insulation by tenure and bureaucracy from the wishes of the public, and excessive preoccupation with the practices of the past, educators are the villains who resist needed change.

It is easy to give such institutional explanations. Not only do they have all the therapeutic advantages of putting the onus elsewhere, they have powerful intuitive appeal. Isn't it true that schools are virtual monopolies, structurally exempt from the pressures of reality? Isn't it true that teachers are mostly a conservative lot, averse to change and convinced of their own omniscience? Therefore, isn't it obvious that faulty implementation is to blame? And thus organizational explanations abound. As one wag puts it, "Books criticizing the dysfunctional consequences of organizational rigidity in public schools are so numerous as to give the publishing industry a stake in resisting educational reform."

However, on closer examination there are problems with most bureaucratic explanations. First, it is simply not true that educators are averse to every kind of change. Indeed, many observers have noted a veritable glut of innovations in public schools. The question therefore is how to explain the observed pattern of educational innovations, not educators' blatant resistance to change per se.

Second, aren't all bureaucracies self-centered, insulated, and averse to change? Polemics against bureaucracies in general constitute a major element of intellectual traditions as diverse as existentialism and populism. Thus, in an important sense, the question is relative: how are bureaucracies in education different? Only in light of such a

comparison can many of the appealing generalizations about change-resistant educators be tested.

Putting these two points in a more positive fashion, in order to illuminate the bureaucratic problems of educational change one needs:

- o A definition of the outcomes one wishes to explain (in this case, the pattern of educational innovations).
- o A testable structure to the logic of the explanation.

Unfortunately, despite the voluminous literature of vilification, neither of these two important tasks has yet been carried out.

In this paper I concentrate on the second point. I try to outline the major logical elements that a theory of innovative behavior should comprise. Basically the outline has four parts: objectives, the implementation process, production possibilities, and the evaluation process. In order to highlight areas where research is needed, I develop two competing explanatory models, both falling under the same logical superstructure but with different emphases and, as it were, different parameter values. One is the "naive hypothesis," the other the "organizational approach." For details on the latter I lean heavily on John Pincus' recent paper "Incentives for Innovation in the Public Schools," although I often caricature his approach in order to stress its disagreements with the naive hypothesis.

The immediate goal is not theoretical subtlety nor even the formulation of a correct explanation. Rather, the paper attempts to promote a certain measure of self-consciousness about the basic assumptions one brings to discussions of educational change. In an atmosphere charged with passion and confusion, the paper hopes to take a modest step toward the formulation and research of testable propositions about innovation and the schools.

II. THE LOGICAL FRAMEWORK

The central ideas of this section are not difficult or novel but nonetheless bear repeating. The failure of a particular innovation cannot a priori be attributed to one part of the educational system (for example, the implementation process). Many analytically different factors contribute to the success or failure of a change, and any explanation must take them into account.

A local school district may not have an innovation for any one (or a combination) of four basic reasons: (1) policymakers do not desire the innovation (objectives); (2) the innovation is not successfully instituted (implementation); (3) the innovation does not work (production possibilities); or (4) after seeing the innovation, the public does not like it and decides to discontinue it by electing new policymakers (evaluation). Unfortunately, it is impossible to discern from the mere absence of an innovation which of these reasons is responsible.

Figure 1 provides a very simple representation of these four parts of the educational system. A general theory of educational change would have to contain all four parts:

(1) Objectives. How policy makers arrive at their objectives; what these objectives are; how different levels of government with their differing objectives interact.

(2) Implementation. How institutions, bureaucracies, and individual actors transmit policy choices into practice.

(3) Production possibilities. The techniques available to obtain desired ends and their efficiency.

(4) Evaluation. How the system "feeds back"; how the public evaluates educational outcomes and holds policymakers responsible for them

The simplest representation of the interrelation of these four parts assumes that a change X either occurs or does not; that each of the four factors (O, I, P, E) are either present or not; and that the presence of O, I, P and E is necessary and sufficient for X to come

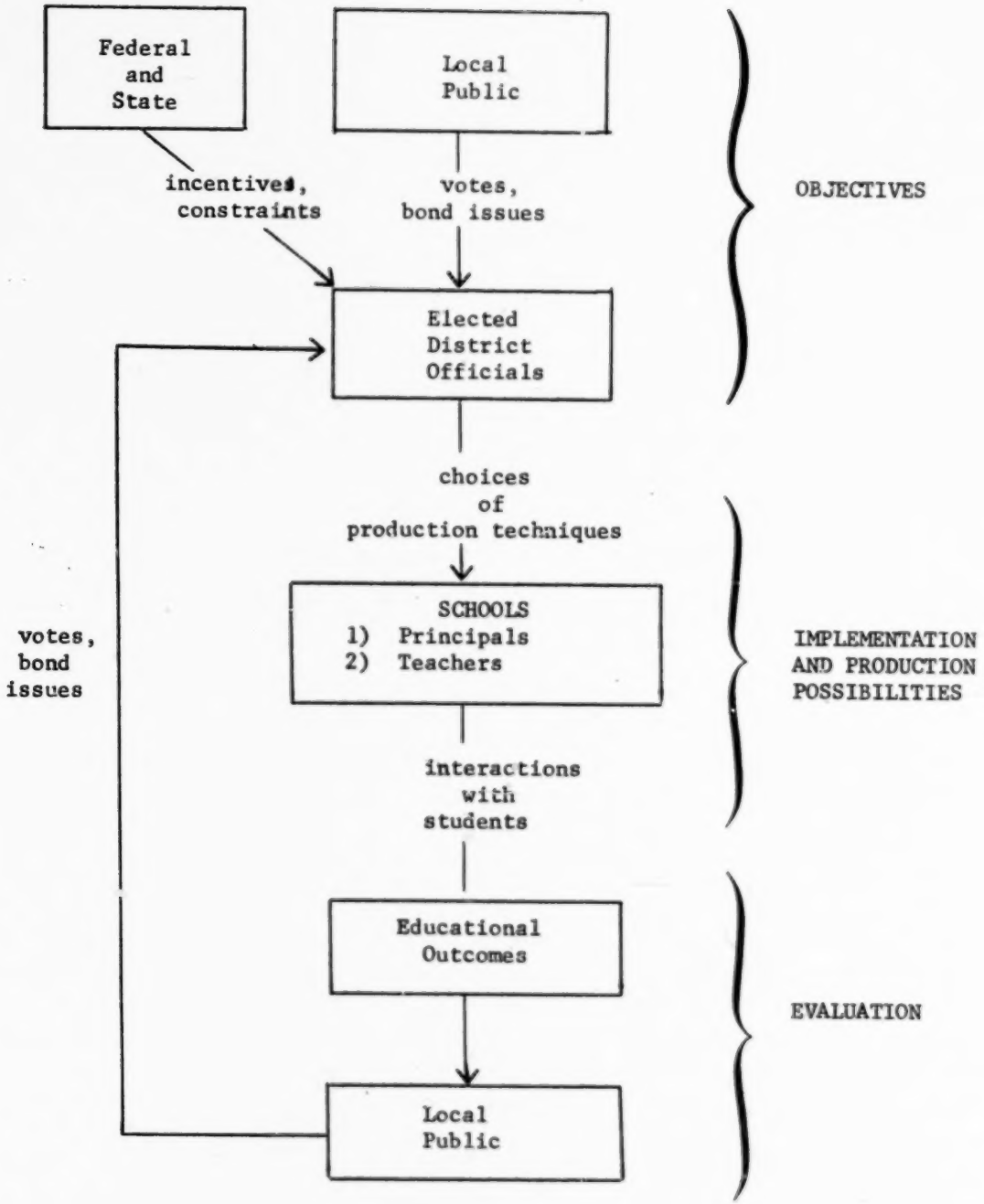

Figure 1

A SIMPLE MODEL OF THE PUBLIC SCHOOL SYSTEM

about. Then not-X only implies that not all four factors were present; it does not by itself say which factors were not there.

The situation may not be binary but continous; then an econometric analogy is appropriate. Defining X as

$$(1) \quad X = f(O, I, P, E),$$

it is clear that to estimate the influence of I (the implementation factor), one must first control for the other variables. Simple correlations between bureaucratic and organizational factors and educational change will not be enough.

The logic of the behavior of educational institutions can be indicated in a quite general cost-benefit framework. At the risk of tautology, we can state that an innovation X is present when its expected utility outweighs its opportunity cost, or when D is positive in :

$$(2) \quad D = E\,[U(X)] - C(X).$$

Now the first expression on the right-hand side has two components: a probability distribution of the levels of benefit A that the innovation X is likely to provide, and a utility valuation of that distribution. In the discrete case where there is a single probability estimate of a single level and type of benefit,

$$(3) \quad E\,[U(X)] = p(X > A) \cdot U(A)$$

The $p(X > A)$ expression corresponds to the district's perception that the innovation will in fact produce the benefit A, that is, its perception of the production possibilities of X. $U(A)$ clearly relates to the district's objectives. And the second expression in the right hand side of (2) refers to the costs, both monetary and bureaucratic.

Crudely speaking, then, these are the interrelated factors affecting change that research ought to examine: objectives, implementation costs and distortions, production possibilities, and evaluations.

However, the discussion is still at too general a level to create specific research suggestions. To highlight particular areas of need, the next two sections present two explanatory hypotheses which treat these four factors quite differently. Section III outlines the naive hypothesis, which lays heavy emphasis on local objectives and production possibilities. Section IV presents an organizational approach, stressing the bureaucratic costs and distortions of the present system of public education. Section V then returns to the question of research needs.

III. A NAIVE MODEL OF EDUCATIONAL INNOVATION

OBJECTIVES

Schools exist because people are willing to pay to have children (usually their own) educated and socialized in certain ways. Schools are publicly funded because education generates socially valuable spillover effects that help other people besides the children and the children's parents. Schools are run at a local level (in the U.S.) because (1) it is felt that most of the spillover effects occur at the local level; (2) communities disagree on which of many possible spillover effects to generate or emphasize; and/or (3) localized control is more efficient in implementation.

The naive model posits that the citizens ultimately decide which educational aims should be pursued. They do this by (1) electing school officials and (2) deciding on expenditure levels via local bond issues. The elected policymakers comprise the school board and the superintendent of schools (at the local level). Their task is to decide the appropriate "production strategy" to fulfill the community's goals. A key feature of the naive model is that the superintendent's and board's objectives do not differ from the community's, insofar as the latter are defined: elected officials have no private objectives apart from responding to the community's wishes in the most efficient fashion.*

The local citizenry does not, however, completely determine the policies that its schools pursue. The inter-relations of local, federal, and state governments add a further complication. The naive model explains inter-governmental conflict in terms of rational disagreement between actors with conflicting objectives.

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*Of course there are the usual complications of a representative form of government. A leader often forms public opinion as well as follows it. A similar problem occurs in economic theory -- often the demand does not exist until an entrepreneur creates it. However, the key point in both democratic and microeconomic theory is that the entrepreneur must ultimately serve the public's interest because of their voting and buying powers. No one would maintain that in every instance the policymaker does exactly what the majority would prefer, or that he could if he wanted to.

Some but not all the spillover effects of education have more than local scope. These include: (1) migration effects, which lead local communities to underinvest in schools since each loses a proportion of its graduates and has no control on in-migrants' education; (2) distributional and social mobility objectives, both among social classes and regionally; (3) the national benefits of a well-educated citizenry, given universal suffrage and the interrelatedness of the national economy.

The different sizes of these different educational spillover effects imply that national and local interests will not always coincide. The federal government (or state, depending on the spillover effect involved) wants to induce local policymakers to provide more of the national-scale spillover effects; but because the merits of local control are also recognized, the federal government does not want to take over all school policy functions. The federal government uses two kinds of tools to influence local decisions:

(1) Constraints, such as legal requirements, which insure that certain minimum (or maximum) standards are met.

(2) Incentives, whether positive through grants-in-aid or negative through taxes, which alter the propensities of local officials to produce certain types of spillover effects.

Normatively, the naive model says that federal (or state) intervention via constraints or incentives is only justified when both (a) a spillover effect of greater than local scope exists and (b) the intervention is believed to influence that spillover effect in the desired direction.

Descriptively, it posits that conflicts over objectives will be resolved by local communities reacting to federal and state constraints and incentives. Federally-encouraged innovations will be desired depending on their perceived expected utility and their opportunity costs to the local district. The opportunity costs will depend on the form of federal grant used, among other things: a lump-sum grant will be effective in promoting innovation X depending on the policymakers'

income elasticity of demand for X; a matching grant depending on X's price elasticity; and so forth.

IMPLEMENTATION

The naive model assumes that policymakers choose policies, techniques, curricula, personnel, etc., solely on the basis of how well these choices serve the public's educational objectives, given the publicly-chosen budget constraint.

However, they are not assumed to make such choices with perfect knowledge about how successful each choice will be. There is imperfect information, technological change, and slippage due to the time it takes to learn. Policymakers' choices are not necessarily optimal; however, they are presumed to be an unbiased attempt to represent the community's objectives.

Policymakers will institute those changes which promise to fulfill the community's objectives most efficiently. If they implement too many or too few from the community's point of view, they will not be re-elected.

The naive model makes a distinction between policymakers and implementers. The elected officials make policy; principals and teachers carry it out.* The implementers in education are assumed to be about as efficient as any other bureaucracy and, more importantly, to be free from distortion due to self-interest. Whatever inefficiencies that do exist are assumed to be normatively neutral (a "dead-weight" loss).

PRODUCTION POSSIBILITIES

The naive model lays great importance on research findings that seem to indicate that most educational innovations, even when implemented,

*Sometimes the "implementers" may have policymaking power. Even though principals and teachers are often tenured and thus not susceptible to the pressures of public wishes as much as elected school officials, the superintendent and school board may decide to delegate some policymaking authority to them. The naive model assumes that if this is done it is because the elected officials feel that the public's objectives are thereby served more efficiently.

do not work. The reason schools do not adopt certain kinds of innovations -- and more generally why educational policy has failed -- is because no reasonably priced educational technologies exist to train some kinds of students. That is, the production processes in themselves are inefficient, given the raw materials and objectives they must work with. If innovations are not instituted, it may be because they are (correctly) felt by local decisionmakers to have a low probability of success.

EVALUATION

The public evaluates school outcomes and responds by the political mechanisms available to it. Note that this is not an economic market model, where consumers have the option of buying or not buying every time they need the "product," nor is it continuously competitive, in the sense that a number of substitutes are immediately available. Comparing schools to competitive markets (or to monopolistic public utilities) misses the nature of the public's evaluation mechanism for education. Schools are similar to other locally provided political goods, except there is perhaps more direct public control in education than in most others, possibly because citizens feel it is the most important one. Thus, schools will be responsive to citizens' wishes, and perverse policies will not be allowed to endure.

IV. AN ORGANIZATIONAL APPROACH

OBJECTIVES

The original rationale for public education no longer matters, for schools now have an institutional permanence which is itself the baseline for analysis. Schools today exist the way they do primarily because they existed that way yesterday. The organizational approach stresses a lack of goals in education. It is not just a question of disagreement about objectives, but a real woolliness on just what schools should be trying to achieve. "Rationality" plays little part in the determination of schools policies; bureaucratic factors dominate. If clarity of goals is an attribute favorable to successful innovation, schools should not expect success.

As the naive hypothesis said, intergovernmental relations present conflicts; but the organizational model says it is misleading to emphasize the conflict of different objectives due to different levels of spill-over effects. Instead, the explanation of the pattern of conflict lies in systematic bureaucratic misunderstandings that occur among government bureaucracies. It is not a conflict characterized by rational actors with different objectives, but one of organizational in-fighting and inefficiency; not levels of the public interest, but levels of bureaucratic interests, are in contention.

The tools available to federal and state governments to influence local districts may theoretically include constraints and incentives of many types, but the organizational approach claims that such tools turn out to be ineffectual. Because of bureaucratic factors, the only real control that the federal government has over district use of funds is the relatively unlikely option of cutting off support.

Thus, in treating local objectives, intergovernmental behavior, and federal grants-in-aid tools, the organizational approach states that bureaucratic factors make the naive model inaccurate.

Normatively speaking, the naive model argued that federal interference should only occur if a change seemed likely to create a

federal-level spillover effect. The organizational approach may draw quite different conclusions: if the world is not descriptively rational, perhaps normative policy should not be rationalistic. Thus, even if innovations do not work, it may be justifiable for federal policy to encourage them. John Pincus puts it this way:

> If the goals are in some sense undefinable, it is inappropriate to adopt the standard rationalist approach of first defining goals, then seeking means appropriate to achieve them efficiently. Instead, R&D strategy should be based at least in part on the converse approach. . . In light of the standards implicit in this paper, a major focus of R&D policy should be -- through experimentation and through incentives that encourage new patterns of institutional behavior -- to encourage a long-overdue diversity of approaches to schooling . . . In the current state of knowledge, this process must be justified primarily on the grounds that an educational system which develops effective mechanisms for innovation is more likely to respond to changing social needs than one which is primarily centered on preserving the existing institutional order. This viewpoint implies that diversity in organizational response itself should be a prime target of policy. (pp. 23, 38; emphasis in original.)

Innovations are not defended as serving any specified local or national spillover effect, but as counters to bureaucratic rigidity. Change and diversity -- apart from that which results from a decentralized system -- are goods-in-themselves.

IMPLEMENTATION

The organizational approach rejects the simple distinction between "policymakers" and "implementers." The naive hypothesis assumes both that elected officials make policy and then teachers and principals execute it, and that inefficiency is a "dead-weight" loss. To the organizational point of view, these are serious errors.

In fact the "implementers" have great freedom to make policy; furthermore, they possess incentive systems that diverge notably from what might be called the public interest. The source of both freedom and bias is their status as a self-perpetuating bureaucracy, free from competitive pressures, committed foremost to its own preservation.

The objectives of schools, according to this view, are the minimization of bureaucratic costs (which accounts for the lack of structural innovations) and the approval of fellow educators (which explains the glut of superficial changes).

Bureaucratic costs are the real costs of the system; far from being a "dead weight," they have a direction, almost a life, of their own.

PRODUCTION POSSIBILITIES

Despite the negative findings of much research on the effectiveness of most educational innovations, the organizational approach often maintains at least an implicit belief in the basic efficacy of education. "Basic efficacy" means this: perhaps past policies have not worked, but the fundamental strategy of improvement through education is sound.

Thus, to explain failures, a rather incredible legion of causes are conjured up. The principal argument, or course, cites the lack of successful implementation of previous policy, for the above-mentioned organizational reasons. But also variously cited are insufficient level of funding, the wrong programs being tried, insufficient experimentation, bungling federal policies, misinformation, poor evaluative studies, inadequate diffusion of educational results, cost pressures, high turnover of federal-level policymakers, rapidly shifting priorities, multipocketed budgeting, inadequate planning or lead time, inadequate preparation for teachers who are to implement programs, Congressional preferences for disbursing money quickly and giving something to everybody, and poor measurement of outcomes.

Faith in the ultimate worth of education is not only touching but obviously prolific in explanations; there will always be a reason available which explains why failure does not mean that production possibilities are poor.

EVALUATION

Local schools are virtual public monopolies. As a practical matter, students and parents must accept whatever their school provides, whether or not they are satisfied with its quality. Pincus says, "A theme of this paper is that the schools, as a peculiar form of regulated public utility, have a different set of incentives to innovate than do competitive firms." (p. 32) And a monopoly means that the "buyers" have no ability to make their evaluations of the goods received have any impact on the seller. In short, the public is assumed to have no direct ways of expressing its educational preferences; no effective mechanism exists to enforce social objectives on the "self-perpetuating bureaucracy."

V. RESEARCH IMPLICATIONS

COMPETING OR COMPLEMENTARY HYPOTHESES?

It may be a mistake to see the naive hypothesis and the organizational approach as strict competitors. For some sorts of problems and for some levels of the same problem, the naive model may be most nearly right; for others, the organizational model; and perhaps for the majority some mixture of the two is best. They can be viewed as complementary tools of analysis, each emphasizing different ways to structure and research a problem. Since there is not yet a comprehensive theory of educational objectives, organizations, and production possibilities, it is wise for educational policymakers to use both conceptual frameworks to help guide their actions.

Nevertheless, there is a sense in which one wishes to decide which approach is more appropriate for federal policy at present. The naive model focuses on local objectives and the low productivity of various educational policies. It has rather restrictive implications for federal R&D policy. The organizational model notes that educational objectives are inherently vague and production possibilities imperfectly known and seldom implemented, and it concentrates instead on the relative freedom of educational bureaucracies to make policy and on their self-serving incentive structures. In some formulations, the organizational model could constitute a call to arms for a policy of massive, federally-supported innovations. How can research help discover which point of view is most correct?

COMPARISON OF THE MODELS

We do not know enough to disprove either model, and our ignorance extends to objectives, implementation, production possibilities, and evaluation. However, each hypothesis has one very strong point: the naive hypothesis on production possibilities, the organizational model on implementation.

The naive model says that schools avoid innovations because they have a low probability of leading to benefits in the public's interest.

The evidence on the lack of success seems to me convincing. As Pincus says,

> If we are to draw reasonable inferences from Jencks and Averch, it makes more sense to invest in innovations in the non-school environment than in the schools themselves, because environmental factors account for far more of the variation in achievement tests, college attendance rates, lifetime earnings, etc., than school factors do or can. (p. 22)

Much of the money spent on educational innovations, no matter how carefully allocated, may therefore be wasted by criteria of overall social policy. If the probability of success is low, this may be a sufficient reason for schools to avoid innovations, apart from allegations of rigidity and self-interest.

On the other hand, the organizational approach musters an array of intuitively pleasing reasons why, even if some innovations were successful by public criteria, they would not be adopted. These reasons fit the facts, and they fit well with much anecdotal evidence.

One difference between the models is pure simplicity or "elegance" of explanation. Occam's Razor posits that among equally satisfactory explanations, the most economical should be chosen. While the naive model can perhaps concentrate on a single cause, namely the lack of production possibilites, the organizational model involves bureaucratic insulation, perverse professional incentives, bungling federal policies, misinformation, poor evaluations, unclear goals, non-competitive markets, and cost pressures.

More importantly, however, the logic of the organizational arguments is sometimes unpersuasive, at least at the present level of generality. Two examples are given as illustrations.

First, in what sense are educators "insulated" from the people's wishes? It is not clear to me that schools are like monopolies or regulated public utilities, nor that the monopoly/competitive firm dichotomy is relevant to education, or for that matter to most political goods. The local citizenry can affect school policies directly through

the election of local policymakers and the specification of funding levels (as well as indirectly through parent groups and private pressure). Buyers in a monopolistic market (like that for a public utility) have no such direct powers. To compare schools to public utilities misses this essential point. Why a school should be assumed to be as insulated from its "customers" as a monopoly -- or, indeed, why it should be any less responsive than a competitive firm providing a similar sort of good -- is not clear to me.*

Second, suppose it is granted that a school system is "noncompetitive." Even so, why should this change its propensity to innovate in different ways? For example, Mansfield and others have shown that large firms and monopolistic industries tend to have as many (and often more) innovations as small firms and competitive industries. Pincus himself summarizes previous writing on innovation which showed that insulation and bureaucratic safety can aid innovation: then why should a monopolistic system be any different in its innovation? The real (as opposed to relative) costs of organizational change should not vary according to market structure. If such a change would be profitable, the fact that it would be additional profit to a monopoly should not alter a profit maximizer's propensity to adopt it, compared to a competitive firm.

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*There are analytically interesting differences in the way public opinion impinges on the supplier in the two cases. A political good goes to all consumers and must satisfy (in a two-party scheme) at least 51 percent of them. A competitively provided economic good goes only to some consumers and has to satisfy only them. This may explain the diffuseness of many political objectives, education's among them. However, in the case of political goods provided locally (like education) as opposed to economic goods supplied nationally, the small size of the political "markets" might be expected to generate relatively specific goals (especially if more than two political candidates generally run) and a relatively diverse set of local outcomes. These differences would be interesting to explore empirically.

Thus Pincus asks us to look at different kinds of innovation, not just the number:

> Compared to a competitive firm, we would expect the public schools
>
> 1. Be more likely than the competitive firm to adopt cost-raising innovations, since there is no marketplace to test the value of the innovation (e.g., smaller class size) in relation to its cost. Therefore, any cost-raising innovation that is congenial to the public school authorities and acceptable to local taxpayers or state and federal funding sources will be adopted.
>
> 2. Be less likely than the competitive firm to adopt cost-reducing innovations, unless the funds so saved become available for other purposes within the district.
>
> 3. Be less likely than the competitive firm to adopt innovations that significantly change the resource mix (e.g., a higher ratio of teacher aides to teachers, sharply increased use of capital-intensive technologies), because any consequent productivity increases are not necessarily matched by greater "profits" to the district.
>
> 4. Be more likely than the competitive firm to adopt new instructional processes or new wrinkles in administrative management that do not significantly change institutional structure, because such innovations help to satisfy the demands of the public, or state and federal governments, and of teachers and principals themselves for change and progress without exacting heavy costs to the district in the form of organizational stress.
>
> 5. Be less likely than the competitive firm to adopt innovations that change the accustomed roles and established ways of doing business, because changes in these relations represent the heaviest kind of real cost to bureaucracies.
>
> 6. Be equally unwilling as competitive firms to face large-scale encroachments on protected markets (voucher systems, metropolitan-area wide open enrollment), although for somewhat different reasons.
>
> From this perspective, the public schools can be seen as more likely than private firms to adopt innovations that do not require complex changes in management structure or organizational relations. (pp. 6-7; emphasis in original).

A priori the insulation of a bureaucracy from market forces could be either innovation-inducing or innovation-inhibiting. Without such insulation, does risk aversion increase because failure will be costly, or does it decrease because market forces mean that success must be demonstrated? Only empirical work can say, it seems to me. Even given a typology of innovations, a priori reasoning can only go so far. It seems hard to argue simply that because schools are non-competitive, they make fewer structural changes, or more non-structural ones.

The same thing can be said of educators' supposed desire for peer group approval. "The elite consensus constraint tends to prevent any but marginal changes from current practice," Pincus argues (p. 12; emphasis in original). But why should the need for elite consensus affect the propensity to innovate in one way or another? (And compared to what? A competitive market? Other public services?) Perhaps only professionals can appreciate major changes, or at least are more appreciative of them than the non-professional public as a whole. There seems to be no a priori deduction from a peer-group approval motive to a conspiracy of risk-averse, unimaginative educators, particularly because here, as in other professions, one gains fame and fortune by doing something new and different.

NEEDS FOR FURTHER RESEARCH

Neither hypothesis can be called victorious; more importantly, policy relevant explanations must dip to a lower level of generality. Further research is therefore necessary. Not research perhaps of the old sort, which took an innovation and investigated whether it worked; but research into the process of innovation itself.

Any explanation must involve all four parts to the educational system. A piece of research may deal with one part, say the implementation process; but until its findings are combined with research about objectives, production possibilities, and evaluation, it cannot constitute an explanation. Thus, research should not proceed piecemeal.

It may be difficult to separate the different factors empirically. Perhaps implementation difficulties cannot be separated from changes

in the objectives of local policymakers, for example. And an outcome can always be attributed to inefficiency in implementation, as opposed to an unproductive process. Since the production process itself can never be observed, an identification problem is always lurking: a system of equations without enough specified variables to yield a solution.

Research must deal with these difficulties by examining variations. Thus, one would like to take the pattern of variations in objectives among districts (and perhaps among many kind of noneducational organizations) and the pattern of implementation and the pattern of production possibilities (or outcomes of different policies) and the pattern of opinions of the citizenry: and one would work through relationships among these patterns, searching for regularities. An analogy from multiple regression is appropriate, even if in education a lack of measures and models makes such a statistical technique inapplicable in practice.

In this spirit of a combined approach and research through variations, the following general program is offered. Unfortunately, it is not just a question of more; research in each area must overcome important methodological and conceptual problems.

OBJECTIVES AND EVALUATION

Objectives are notoriously difficult to research. First, only with great faith can one assume that verbalized objectives are real ones. Second, if one eschews verbalizations and studies outcomes, it is a posteriori impossible to separate a low weighting for an objective from inefficiency in the means used to pursue it. Third, even in a democratic system the objectives of elected representatives cannot be equated with the objectives of the electorate on every issue. The first difficulty makes surveys of school officials hard to evaluate; the second means that one cannot deduce objectives from the pattern of outcomes achieved; and the third implies that community opinion polls will not necessarily coincide with the community's elected leaders' goals on every issue. Thus it is extremely difficult to

discover what a local school district's goals are, or whether the objectives of the policymakers are those of the community; the efficiency of the evaluation process cannot be directly gauged.

Nonetheless, systematic studies of stated objectives would be worthwhile. One might imagine a detailed survey of federal and state policymakers, school superintendents, school board members, principals, and teachers. In order to be able to connect these objectives with actual policies, it would be important to have objectives stated in precise, quantifiable form, and to avoid philosophical generalities with which any policy whatever would be consistent. (This requirement alone might make the task well nigh impossible, although the Los Angeles school district is presently asking its schools to specify an objective hierarchy, ranging from philosophical objectives down to measurable short-run outputs.)

Given such data, one would ask questions like the following. What is the pattern of the differences between school districts? Between levels of government? Between district-level policymakers in the same school system? Between superintendents and the school board on the one hand, and principals and teachers on the other?

Then an effort would be made to tie these objectives (and the conflicts therein) to observed school district behavior, such as the types of policies, patterns of innovation, election results, and so forth.

Because of the methodological shortcomings cited above, and because objectives and evaluation comprise only parts of an explanation, the results of such research will be equivocal. Still, the naive hypothesis would tend to be supported by a tight fit between stated district-level objectives and observed behavior, across different districts and different kinds of goals. It would also be supported if conflicts in verbalized objectives between the various levels of government could explain their conflicts over actual policies (for example, the troubles of some federally-funded innovations).

The organizational model would be supported by muddle-headedness and inconsistency about objectives by district-level policymakers; by apparent consistency in verbalized objectives between levels of

government and across different school districts, despite wide disparities in actual behavior; and by a close connection between outcomes and the objectives of principals and teachers, if these were at odds with the objectives of policymakers at higher levels.

This research could produce many indirect benefits as well. Apart from the power of educators' objectives to explain school behavior, they have great normative interest in themselves. Their systematic elucidation could spark healthy public debate of educational goals and indirectly stimulate new, more responsive policies.

ORGANIZATIONAL BEHAVIOR AND IMPLEMENTATION

Most organizational models of schools are admittedly weak on empirical data. Most of them rely on persuasive a priori reasoning whose implications are not at variance with what little evidence existed. And most compare schools to other organizations, usually in terms of theoretical incentives rather than empirically-established behavioral findings. Research should be designed to bolster what is empirically known about organizational behavior both in schools and in other bureaucracies to which schools might reasonably be compared. To what extent are schools homogeneous organizations? What are their characteristics? How do they differ from other kinds of institutions?

Particular attention would be given, of course, to innovative behavior. Pincus' typology of innovations, reworded below, seems to be a good place to begin:

It is convenient to classify educational innovations by their effects in five categories:

1. Innovations that increase the level of resource use only ("More of the same" -- e.g., a smaller class size).

2. Innovations that change the resource mix (a higher proportion of teacher aids, relative increase in capital equipment).

3. Innovations that change instructional processes or methods without significantly changing resource level or mix (new math, new reading curriculum).

4. Innovations that affect administrative management, without significant effects on organizational power structures (computerizing data management, new accounting systems).

5. Innovations, whatever their other effects, that change either the organizational structure of the schools or their relation to external authority (community control, open schools, voucher systems). (restated from p. 6)

But the major definitional problem still remains. What is an "innovation?" Most previous studies have floundered on this question, often identifying innovations with a residual. If a serviceable concept could be devised, one would want to compare the pattern and magnitude of innovations among many kinds of organizations, such as:

- o Public schools (particularly, if and how schools differ among themselves)
- o Private schools (academic and vocational)
- o Public utilities
- o Public services (police, etc.)
- o Public bureaucracies providing "political goods" of various kind (anti-discrimination agencies, State Department, any number of others)
- o Competitive private firms (large and small)
- o Monopolistic private firms (large and small)
- o Professions (doctor services, etc.)

One would wish to compare these bureaucracies along other dimensions besides innovative behavior, specifically those to which explanatory power is often ascribed in the case of education: the autonomy of the semi-permanent bureaucracy; the importance of peer group approval; the role of information (particularly the communication of innovative successes and the quality of evaluative studies); and the clarity of organizational goals.

As in the case of research into educational objectives, no findings here are likely by themselves to conclusively refute one of the two

competing models. However, the naive model would tend to be supported if the various types of organizations did not really differ in innovative behavior or other organizational factors, or if differences did not tend to explain variations in innovative behavior. The organizational model would receive confirmation if systematic differences between schools and between types of organizations did explain differences in outcomes.

PRODUCTION POSSIBILITES

Most research in education has occurred in this area, yet it would probably be misleading to say that the jury can come in. It is true that in my opinion enough research has been done to warrant a very skeptical, cautious attitude toward educational innovations. But past research suffers from three shortcomings:

- Excessive reliance on one dimension of output, namely cognitive achievement scores;
- Very short time frame;
- Usually small-scale, both in terms of the magnitude of the departure from present practice and the number of students (and types of students) affected.

Further research needs to emphasize multi-dimensional evaluation of school results, perhaps utilizing the results of the research proposed above into school objectives and the preferences of students and parents. A good deal of conceptual and measurement work is needed in this area. Federal innovations should probably concentrate on long-run, large-scale, large-magnitude changes from present school policies and structures. Even so, however, compared to research in other social policy areas, education may not warrant intensive efforts.

Research on innovative behavior should attempt to compare the educational productivity of the types of innovations schools do adopt and the kinds they ignore or fail to implement. The naive hypothesis would tend to be supported if the former tended to be "successful," the latter

(when actually implemented) not so. The organizational model would descriptively be supported by finding no productivity differences between those innovations adopted and those ignored. Normatively, however, the organizational view can in my judgment be defended only if some innovations do offer a significant prospect for educational benefits. Only then, it seems to me, should the federal government be interested in funding them. The tendency not to implement futile innovations may in some sense be due to bureaucratic pressures, but if such changes are nonetheless futile, they <u>should</u> not be implemented.